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10/784,763	02/23/2004	Jayesh Jasapara	3-7	2221

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EXAMINER	
TURNER, SAMUEL A	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 12/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/784,763	JASAPARA ET AL.	
	Examiner	Art Unit	
	Samuel A. Turner	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Withdrawal of Indicated Allowability

The indicated allowability of claims 16, 17, and 20-22 is withdrawn in view of the newly discovered reference(s) to Presby(4,168,907) and Rochester(5,410,396). Rejections based on the newly cited reference(s) follow.

Drawings

The drawings are objected to because they fails to show the polarizer and the polarizing beam-splitter of claims 3 and 4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application.

Replacement Drawing Sheets

Drawing changes must be made by presenting replacement sheets which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments section, or remarks, section of the amendment paper. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). A replacement sheet must include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and within the top margin.

Annotated Drawing Sheets

A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheet(s) must be clearly labeled as "Annotated Sheet" and must be presented in the amendment or remarks section that explains the change(s) to the drawings.

Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings MUST be filed within the THREE MONTH shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

Claim Objections

Claims 1 and 14 use the language "consisting of" which excludes any element, step, or ingredient not specified in the claim. Claims 3, 4, 15-18, and 20-23 are objected to as improper dependent claims because they add further limitations which do not simply further limit the limitations of claims 1 or 14.

Claim 11 is objected to because it claims a "continuum lightwave source" instead of a continuous lightwave source.

Claim Rejections - 35 USC § 101

35 U.S.C. § 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 15-18, and 20-23 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.

The claims are directed to a judicial exception; as such, pursuant to the Interim Guidelines on Patent Eligible Subject Matter (MPEP 2106)), the claims must have either physical transformation and/or a useful, concrete and tangible result. The claims fail to include transformation from one physical state to another. Although, the claims appear useful and concrete, there does not appear to be a tangible result claimed. Merely analyzing, calculating, determining, selecting, etc. would not appear to be sufficient to constitute a tangible result, since the outcome of the analyzing, calculating, determining, selecting, etc. step has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. As such, the subject matter of the claims is not patent eligible.

Claim 14 includes the limitation of "applying a fast Fourier transform"; claim 15 includes the limitation of "analyzing the cosine waveform"; claims 16, 17, and 22 include the limitation of "comparing"; claim 18 includes the limitation of "recognizing the presents"; and claim 21 includes the limitation of "reviewing the fast Fourier transform peaks". These limitations do not provide a physical transformation and/or a useful, concrete and tangible result.

While these steps appears useful and concrete the Fourier transformed data analyzed, calculated, determined, selected, etc is abstract because nothing is done

with the data(saved, displayed, or used). Claims 20 and 23 are dependent on claim 14 and therefor are also included in the rejection.

Claim Rejections - 35 USC § 112, second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6-8 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 6-8 are confusing because they are directed to the embodiment of figure 11 which does not appear to provide for focusing the light onto the object. Therefor these claims conflict with claim 1.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 9-11, and 13 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by McLandrich et al(5,341,205).

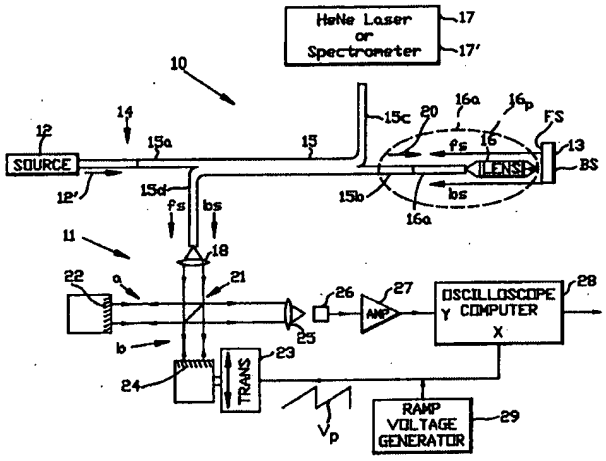


FIG. 6

With regard to claim 1, McLandrich et al teach an optical coherence tomography arrangement(Fig. 6) for measuring predetermined characteristics of an optically transparent object, the arrangement consisting of;

a broadband lightwave source(Fig. 6, 12) for generating a broadband optical test signal;

an optical beam splitter including a pair of input arms and pair of output arms(Fig. 6, 15),

a first input arm coupled to the output of the broadband lightwave source(Fig. 6, 15a) for supporting the propagation of the broadband optical test signal through the optical beam splitter,

a lensing arrangement(Fig. 6, 16) coupled to a first output arm of the optical beam splitter(Fig. 6, 15b), the lensing arrangement for first collimating and then focusing the broadband optical test signal(column 8, lines 19-20) toward an optically transparent object to be measured(Fig. 6, 13); and

an optical spectrometer(Fig. 6, 11,28), coupled to a second input arm of the beam splitter(Fig. 6, 15d), said optical spectrometer receptive a plurality of interfering reflected signals from the optically transparent object disposed beyond the lensing arrangement,

the optical spectrometer for providing a spectrogram signal of the plurality of interfering reflected signals and generating a fast Fourier transform of the spectrogram signal associated with the optical path length of the measured object,

wherein signal peaks within the fast Fourier transform are related to transition interfaces between materials in the optically transparent object and are associated with the predetermined characteristics of the optically transparent object.

As to claim 2, wherein at least one predetermined characteristic of the optically transparent object is the thickness of a layer within the optically transparent object(column 7, lines 63-64),

the thickness determined by filtering the peaks in the fast Fourier transform, and

performing an inverse fast Fourier transform on the filtered signal to retrieve a cosine waveform corresponding to the interference between two adjacent layers within the optically transparent object.

As to claim 9, wherein the optical beam splitter is a 50:50 beam splitter(**column 8, lines 11-12**).

As to claim 10, wherein the broadband lightwave source comprises an erbium-doped fiber lightwave source(**column 20, line 38**).

As to claim 11, wherein the broadband lightwave source comprises a continuum lightwave source(**Fig. 6, 12; column 14, lines 44-45**).

With regard to claims 1 and 2, the remaining claim limitations found are functional limitations and these limitations can be met by the prior art if the structure of the prior art is capable of performing the claimed functions. Clearly the interference spectrometer 11 and the computer 28 are capable of performing Fourier transform analysis, also see column 6, lines 61-64. For functional language to limit an apparatus claim the limitation must be claimed using a "means-plus-function" format of 35 U.S.C. § 112, sixth paragraph.

2114 [R-1] Apparatus and Article Claims — Functional Language

APPARATUS CLAIMS MUST BE STRUCTURALLY DISTINGUISHABLE FROM THE PRIOR ART

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device

does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

With regard to claim 13, the limitation "utilized with an optical fiber" is an intended use limitation and it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. § 103(c) and potential 35 U.S.C. § 102(e), (f) or (g) prior art under 35 U.S.C. § 103(a).

Claims 5-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over McLandrich et al(5,341,205).

McLandrich et al fail to teach a first collimating lens and a second focusing lens, instead teaching a graded index(GRIN) rod lens 16 to collimate and optionally focus the measurement beam onto the sample 13(column 8, lines 15-19). The GRIN lens is not specifically coupled directly to the fiber.

Official notice is taken that various telescopic lens arrangements, including the claimed collimating lens coupled to a focusing lens, are notoriously well known optical sample illumination optics. Further, coupling a GRIN lens directly to an optical fiber sensor tip is a well known configuration. See In re Malcom, 1942 C.D 589; 543 O.G. 440.

If applicant does not traverse the examiner's assertion of official notice or applicant's traverse is not adequate, the next Office action will indicate that the common knowledge or well-known in the art statement is taken to be admitted prior art because applicant either failed to traverse the examiner's assertion of official notice or that the traverse was inadequate.

With regard to claim 5, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mclandrich by replacing the GRIN lens with an equivalent bulk optical lens arrangement.

The motivation for this modification would have been based on availability of the various equivalent optical elements and the distance between the fiber and the sample.

With regard to claims 6-8, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McLandrich by connecting the GRIN lens directly to the fiber tip of the fiber end.

The motivation for this modification would have been based on the desire to form an integrated sensor head, further it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art, *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

Claims 3 and 4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over McLandrich et al(5,341,205) in view of Tearney et al(6,134,003).

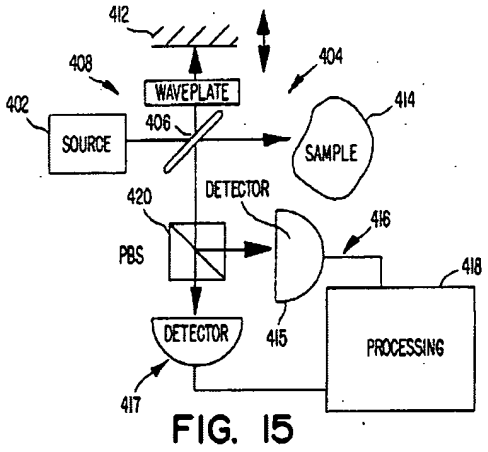


FIG. 15

McLandrich et al fail to teach placing a polarizer element disposed within the lensing arrangement or a polarization beam splitter for directing signals of a first polarization state toward said optical spectrometer and directing signals of a second, orthogonal polarization state toward a second optical spectrometer so as to simultaneously capture information associated with both polarization states.

Tearney et al teach an equivalent OCT arrangement wherein the sample 414 is placed directly into the interference spectrometer. Tearney includes a polarization diversity detector by placing a polarization controller into the measurement path and uses a polarizing beam-splitter(420) to detect the orthogonal

polarization states which provides information about the birefringence of the sample(column 14, lines 43-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mclandrich by placing a polarization controller into the measurement beam and placing a polarizing beam-splitter into the detection path.

The motivation for this modification is found in Tearney which teaches that this arrangement is insensitive to polarization fading and can measure the birefringence of the sample.

Claims 14, 15, 20, and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over McLandrich et al(5,341,205) in view of Horie(5,440,141).

With regard to claim 14, Mclandrich et al teach a method for determining characteristics of an object using an optical coherence tomography technique, the method consisting of:

illuminating the object, in a direction essentially perpendicular to the fiber axis, with a focused broadband light(column 7, lines 59-66); and

collecting reflected signals from a plurality of interfaces within the object at an optical spectrometer, the interfaces including the plurality of interfaces between air and an outer surface and interfaces between separate layers within the object, the reflected signals forming an interference pattern of a cosine signal form(column 8, lines 54-68).

McLandrich et al **fail to teach** an optical fiber as the object under test or the use of a fast Fourier transform to determine the thickness of separate layers.

Horie teach a method of measuring the thickness of multilayered films from spectral information comprising:

applying a fast Fourier transform to the interference pattern to generate a frequency domain representation associated with the optical path length, where peaks in the fast Fourier transform are associated with interfaces between different layers within the optical fiber, allowing for the thickness of separate layers to be determined, claim 14 **(column 10, lines 63-65)**;

filtering the peaks within the generated fast Fourier transform, claim 15 **(column 11, lines 24-27)**;

applying an inverse fast Fourier transform to the filtered signal to retrieve a cosine waveform corresponding to the interference between any two adjacent interfaces, claim 15 **(column 11, lines 49-51)**; and

analyzing the cosine waveform to calculate the distance between any two interfaces, claim 15 **(column 11, line 51-column 12, line 44)**.

With regard to claims 14 and 15, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McLandrich by applying the method to measuring optical fibers, and further applying the fast Fourier transform method of Horie to the calculation of multi-layer films.

The motivation for these modifications are found in McLandrich and Horie. First, McLandrich teaches applying optical coherence tomography to other substrate and waveguides, thus applying OCT to a fiber would have been obvious because an optical fiber is a waveguide. Second, Horie teaches that a Fourier analysis can be applied to multi-layer films which is an improvement over the single film calculation of Mclandrich.

As to claims 20 and 21, because air holes in a fiber would be seen as another layer it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the McLandrich measurements processed by Fourier transform analysis to any waveguide or thin film structure.

The motivation for this modification is found in the Fourier transform which detects any layer change including layers of air, caused by air holes in the fiber. Optical coherence tomography with thus provide both film thickness and a 3-D image of the sample under test.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over McLandrich et al(5,341,205) and Horie(5,440,141) as applied to claims 14, 15, 20, and 21 above, and further in view of Presby(4,168,907).

McLandrich et al **fail to teach** measuring the eccentricity of an optical fiber.

Presby teaches an interferometric method of measuring layer structure, size, and eccentricity of a fiber perform**(abstract)**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McLandrich by rotating a fiber and measuring the changes in thickness of each layer as the indication of eccentricity.

The motivation for this modification is found in Presby which suggests that rotating a cylindrical object will be indicative of the shape of any transparent layers. A minimum of 90^0 would be necessary for any shape measurement.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over McLandrich et al(5,341,205) and Horie(5,440,141) as applied to claims 14, 15, 20, and 21 above, and further in view of Sorin et al(5,202,745).

McLandrich et al **fail to teach** a polarization beam splitter for directing signals of a first polarization state toward said optical spectrometer and directing signals of a second orthogonal polarization state toward a second optical spectrometer and comparing the thickness results associated with each fast Fourier transform to measure characteristics of eccentricity.

Sorin et al teach an OCT arrangement wherein a polarization diversity detector having a polarizing beam-splitter is used to detect the orthogonal polarization states which provides information about the birefringence of the sample(**column 14, lines 43-67**). Other types of information can also be extracted from the tomographic signal including the location, type, and magnitude of discontinuities or defects(**column 1, lines 23-25**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mclandrich by placing a polarizing beam-splitter into the detection path to derive orthogonal signals.

The motivation for this modification is found in Sorin which teaches that this arrangement is insensitive to polarization fading and can measure birefringence and other properties of an object. The eccentricity of a fiber can be extracted from the tomographic image generated.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over McLandrich et al(5,341,205), Horie(5,440,141), and Sorin et al(5,202,745) as applied to claims 14, 15, 17, 20, and 21 above, and further in view of Rochester(5,410,396).

McLandrich et al **fail to teach** measuring a fiber under tension.

Rochester teaches testing an optical fiber for a variety of properties while the fiber is being wound. Because the fiber is wound it will be under tension. These various tests can then be performed under differing tensions**(abstract)**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McLandrich by placing the test into the manufacturing process wherein the fiber is under tension.

The motivation for this modification is found in McLandrich which is applied to in-situ testing**(column 2, lines 30-33)**.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over McLandrich et al(5,341,205) and Horie(5,440,141) as applied to claims 14, 15, 20, and 21 above, and further in view of Venkatesh et al(5,633,712).

McLandrich et al fail to teach placing an optical fiber in a cavity to increase the number of reflections.

Venkatesh et al teach placing an object under test(15) between first and second reflectors(25,26)(column 3, lines 55-61). The additional peaks are used to simplify the interpretation of the peak pattern(column 4, lines 45-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McLandrich by placing a fiber between two reflectors which form a cavity.

The motivation for this modification is found in Venkatesh which teaches that the additional peaks are used to simplify the interpretation of the peak pattern.

Relevant Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nishizawa et al(5,523,840), see figures 1a and 1b; Holbrook et al(6,226,086), see figure 8; Duncan et al(6,496,265), see figures 1, 3, and 8; and NN931249, figure 1.

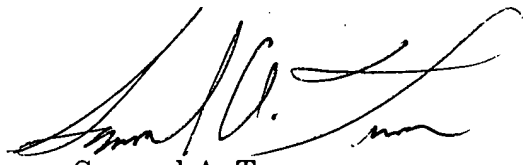
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Turner whose phone number is 571-272-2432.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached on 571-272-2800 ext. 77.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Samuel A. Turner
Primary Examiner
Art Unit 2877